

16, the battery unit 18 and the power control unit 20, are desirably protected from damage when a collision occurs to the electric vehicle 10. As such, the motor 16, battery unit 18, and the power control unit 20 are disposed away from a rear face 10_r of the electric vehicle 10 to avoid possible damage caused by a rear-end collision, although they are disposed in a rear portion 12_r of the vehicle body 12.

[0031] As shown in FIGS. 1 to 3, the electric vehicle 10 further includes a spare tire 24 and a brace 30 that supports the spare tire 24. The spare tire 24 is disposed in the rear portion 12_r of the body 12. Although not particularly limited, the spare tire 24 is laid flat. The expression “laid flat” herein means that a center axis (rotary axis) of the spare tire 24 is parallel to the vertical direction, or that an angle formed between the center axis and the vertical direction is less than 45 degrees. In the electric vehicle 10 of the embodiment, the spare tire 24 is fixed to the body 12 with the center axis of the spare tire 24 being parallel to the vertical direction.

[0032] The rear portion 12_r of the body 12 includes a rear floor panel 40 and a back panel 48. The rear floor panel 40 is located below the spare tire 24 and forms a floor in the rear portion 12_r of the body 12. The back panel 48 is located rearward of the spare tire 24 and forms a rear wall in the rear portion 12_r of the body 12. A rear end 40_b of the rear floor panel 40 is connected to the back panel 48. The spare tire 24 is disposed in a luggage compartment defined by the rear floor panel 40, the back panel 48, and a pair of side panels (not shown). The body 12 further includes a bumper reinforcement 50 disposed rearward of the back panel 48. The bumper reinforcement 50 extends in the width direction along the back panel 48.

[0033] The brace 30 is fixed to the body 12 and extends in the longitudinal direction. The brace 30 is located below the spare tire 24 and supports the spare tire 24 from below. The brace 30 is constituted, for example, of metal such as a steel material. However, in an alternative embodiment, the brace 30 may be constituted of other materials such as fiber-reinforced resin. A front end 30_a of the brace 30 is fixed to the rear floor panel 40, and a rear end 30_b of the brace 30 is fixed to the back panel 48. The front end 30_a of the brace 30 includes a tire mounting portion 32 and is located below a hub mounting portion 26 of the spare tire 24. The hub mounting portion 26 of the spare tire 24 is fixed to the tire mounting portion 32 by a tire fastener 36. The tire fastener 36 is, for example, a screw member with a tab and can easily be tightened or loosened by the user. According to this configuration, the hub mounting portion 26 of the spare tire 24 is removably mounted to the front end 30_a of the brace 30.

[0034] Although not particularly limited, the front end 30_a and the rear end 30_b of the brace 30 are each fixed by one or more bolts 52. However, in an alternative embodiment, the front end 30_a and/or the rear end 30_b of the brace 30 may be fixed to the body 12 by welding or other means. The front end 30_a and the rear end 30_b of the brace 30 may be fixed to any portions of the body 12 without limitation to the rear floor panel 40 and the back panel 48, as long as the rear end 30_b of the brace 30 is fixed to the body 12 at a position rearward of the front end 30_a of the brace 30. Further, a longitudinal direction of the brace 30 may not be parallel to the longitudinal direction of the electric vehicle, and a part or an entirety of the brace 30 may be inclined in the vertical direction and/or the width direction to form an angle relative to the longitudinal direction.

[0035] The rear floor panel 40 of the present embodiment includes a front area 42 to which the front end 30_a of the brace 30 is fixed and a rear area 44 extending between the front area 42 and the back panel 48, although this is merely an example. The rear area 44 is depressed downward relative to the front area 42, and defines a depression 46 between the front area 42 and the back panel 48. The brace 30 extends over the depression 46 of the rear floor panel 40 and supports the spare tire 24 above the depression 46. The electronic control unit 22 described above is disposed in the depression 46 of the rear floor panel 40. Further, the motor 16 and the power control unit 20 are disposed frontward of the depression 46. The motor 16 and the power control unit 20 are located below and frontward of the spare tire 24.

[0036] As shown in FIGS. 4 and 5, the brace 30 includes a bent portion 30_c located between the front end 30_a and the rear end 30_b, and has a shape that is generally bent in a mountain fold. Thus, the bent portion 30_c of the brace 30 is located above a straight line L connecting the front end 30_a and the rear end 30_b of the brace 30. The brace 30 has a certain thickness, and respective sections of the front end 30_a and the rear end 30_b fixed to the body 12 may have various shapes according to the shape of the body 12. To more accurately define the shape of the brace 30, with respect to a center axis A extending in the longitudinal direction of the brace 30 over sections 30_d, 30_e located between the front end 30_a and the rear end 30_b of the brace 30 as shown in FIG. 5, a position A3 of the center axis A at the bent portion 30_c is located above the straight line L connecting both ends A1, A2 of the center axis A. The number of the bent portion 30_c is not limited to one, and the brace 30 may include a plurality of bent portions 30_c. In this case, at least one of the bent portions 30_c may be located above the straight line L connecting the front end 30_a and the rear end 30_b of the brace 30.

[0037] According to the structure described above, when a rear-end collision occurs to the electric vehicle 10 as shown in FIG. 6, a compressing force is applied to the brace 30, which extends in the longitudinal direction, from the rear end 30_b toward the front end 30_a. Since the bent portion 30_c is present at the intermediate position of the brace 30, the brace 30 deforms to bend at the bent portion 30_c. Especially, the bent portion 30_c of the brace 30 is located above the straight line L connecting the front end 30_a and the rear end 30_b of the brace 30 (see FIG. 5), thus the brace 30 bends to cause the bent portion 30_c to protrude upward (that is, in mountain fold shape) and pushes the spare tire 24 upward. The spare tire 24 being pushed upward suppresses frontward movement of the spare tire 24, by which invasion of the spare tire 24 to constituent elements located frontward of and/or below the spare tire 24, such as the high voltage components like the motor 16 and the power control unit 20, can be avoided, or a degree of the invasion can be reduced. The thickness of the brace 30 at the front end 30_a is greater than the thickness at the section 30_d adjacent thereto. As such, stress tends to concentrate at a boundary position between the front end 30_a and the adjacent section 30_d, and the brace 30 is designed to bend at this position as well.

[0038] Although not particularly limited, the rear end 30_b of the brace 30 is located below the front end 30_a of the brace 30 in the electric vehicle 10 of the present embodiment. Such a configuration facilitates deformation of the brace 30 into an intended shape (i.e., the mountain fold shape shown in FIG. 6) and pushes the spare tire 24 upward